

pare Bowerbank's species with his own, I find it advantageous to review Carter's essay from my point of view, so that in the future any one may be enabled to make use of it.

For any one who holds views similar to those of Polejaeff, Vosmaer, and myself, this review will be most welcome, as I, in possession of extensive collections and working the subject on the spot, am best able to judge.

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III.—On the *Teredo utriculus* of Gmelin, with Remarks upon other Ship-worms. By SYLVANUS HANLEY, F.L.S. &c.

UNTIL lately this ancient species, founded upon a well-executed drawing in Kämmerer (Conch. Cab. Rudolst. t. i.), was omitted, or neglected, in our lists of sea-shells. Of late it has been cited as a synonym of the *T. norvagicus* of Spengler, a conclusion which my recent examination of a most magnificent group acquired by me at Cannes from the wreck of a submerged Italian ship does not confirm. It may, indeed, be a variety, yet with differences in tube, valves, and pallets so perceptible that the untrained eye (I mean as to shells) of a portrait-painter immediately indicated them. I may remark that the *Fistulana corniformis* of Lamarck (as pictorially defined by a reference to Favanne) seems identical; the tube, at least, is closed at the broader end by a dome-shaped covering (as in the genus *Septaria*, = *Kuphus*), which with the bar-like stricture at the narrower extremity are the principal features exhibited in Kämmerer's plate. The pallets are more leaf-like and with shorter stalks than in *norvagicus*, the tube (besides its dome, which some say is present, although I have not myself found it) in all adult members of the genus is more fragile, and the thin valves easily distinguishable by their outline, the fang or central portion being broader and much shorter in proportion than in the solid dark-skinned northern shell to which it has been affiliated. The most striking character, however, is the large space occupied by the finely sculptured triangular area, which descends far down the broad fang.

The species (or variety, if you will) is a southern form; but I obtained many young specimens (valves only) from Guernsey, an outlying province of the Mediterranean fauna,

which I cannot distinguish. The more prominent features seem the peculiar thinness of the valves, whose swollen triangular area is so large as to occupy one half the entire length (hence the fang seems peculiarly short).

During the last twenty years four principal monographic lists of the Teredines have been published by Jeffreys, Fischer, Tryon, and Sowerby. The last, the only one which has been illustrated, and consequently the only one which will enable the mass of collectors to determine their specimens, is by Sowerby in his hurried conclusion of Reeve's 'Conchologia Iconica.' Unfortunately he has neglected the many new species (*subericola*, *excavata*, *bipartita*, *spatha*\*, *fusticulus*) described by Mr. Jeffreys in the 'Annals and Magazine of Natural History' for 1860; these, although elaborately described, are unknown to me (for want of figures or, perhaps, of examples), as well as to most conchologists; hence illustrations of them would have been generally acceptable.

As my long study of this genus and the possession of a remarkably fine collection of Teredines have enabled me to correct certain errors in the 'Iconica,' and to suggest additional statements, I venture to critically annotate many of the species indicated. In order to obtain absolute certainty as to what the draftsman actually intended, I have carefully looked for the examples declared to have been drawn from specimens in the British Museum, where, although aided by the Curator, I have often failed to discover them.

The sequence here followed is that adopted in the text which accompanies the four and only plates.

*T. navalis*.—The reference to Sellius, who expressly mentions that he uses the term "*Teredo marina*" † generically, should be pl. ii. figs. 2, 3, 6; to Spengler, Skriv. Nat. Selskab. vol. ii. pt. 1, p. 103, pl. ii. fig. C.

*T. norvagica*.—The reference to Spengler's monograph should be pl. ii. figs. 4, 5, 6; to *T. nigra*, Blainville, Diction. Sc. Nat. vol. lii. p. 267, as in 'Quarterly Review,' pl. i. fig. 20, *a, b*. *T. navium* of Sellius had better have been omitted, for although that author classed all the ship-worms known to him as *Teredomarina* (a compound generic name), he has copied (?) a bud-shaped pallet, which he regarded as

\* Pallets in British Museum, *teste* Jeffreys.

† *Teredo* means a borer; the adjective *marina* is used to distinguish the salt-water worm from *Teredo vestium*, the larva of the clothes moth. Hence it is logically absurd to claim precedence for it.

the *T. navium* of Vallisnieri; judging from the figure that pallet has a shorter stalk and is more tapering at the broader end than is customary in this species.

*T. bipennata*.—This is *not* the shell delineated in Turton's 'Conchological Dictionary' (figs. 28, 40). The valves look like those of the erroneous *navalis* of Spengler (Skriv. Nat. Selskab. vol. ii. pt. 1, pl. ii.), the pallets of which (perhaps they are worn) seem unlike any of those figured in the 'Iconica,' and remind one of the original drawing of the lost *palmulata*. The two pallets delineated in the 'Iconica' surely belong to two different species, the short-stalked one possibly to Gray's *carinata*. I could not find them in the British Museum, as stated in the text. Mr. Edgar Smith assures me that he can find no shell there under this name which agrees with fig. 3, *a*, or any two dissimilar pallets like those represented by fig. 3, *b*.

*T. Stutchburii*.—The truncated pallet seems broken, yet is not so really. As Blainville (Dict. Sci. Nat. vol. xxxii. p. 268) professedly described this shell from a manuscript species of Leach's, which formed part of our national collection, it may reasonably be supposed that the identification is correct; yet Blainville asserts that the pallet tapers\* rapidly from the first joint to the last, which is not the case in the specimen marked as Leach's type, nor in the figure supposed to represent it.

*T. carinata*.—This shell was no manuscript species as supposed. The name was published by Gray as that of a new species, and by Blainville, as of Leach's manuscript, almost contemporaneously. Gray's monograph appeared in Taylor's 'Philosophical Magazine' for December 1827 (p. 411, copied in Hanley's 'Recent Bivalves,' p. 4); the volume (lii.) of the 'Dictionnaire des Sciences Naturelles' bears date 1828; both authors described from an example in the British Museum, presumably the same as that roughly delineated by Sowerby, who unfortunately represents for it the *Teredo* previously published (1819) by Turton as *T. bipennata* (Conch. Diction. p. 184, figs. 38, 39, 40). But Gray indicates that the base (or stalk) of the pinnately articulated pallet is short, whereas it is represented by both Turton and Sowerby as decidedly long; evidently, then, the *carinata* of Sowerby is not that of

\* The drawing is scarcely to be termed a likeness.

Gray, who subsequently referred the forgotten *T. pennatifera* of Blainville (*loc. cit.* p. 269) to Turton's species. The British Museum does not possess the beautiful pallet ascribed to it in the text of the 'Iconica.'

\**T. megathorax*, Gould.—In what work? Can the name be a mistake or a misprint for *T. thoracites* of Gould's 'Otia' (from Proc. Bost. vol. vi.), otherwise omitted? It is certainly, however, not the *Calobates thoracites* of Wright in the Linnean Soc. Trans. (vol. xxv. pl. lxiv.), or its ally *C. australis* (*ib.* figs. 1-5), both of which are here omitted.

*T. campanulata*, Deshayes.—This supposed manuscript species has been quoted by Tryon—whose monograph evinces a most painstaking research—as the real *Stutchburyi* of Blainville! I could not descry the delineated valves in the British Museum; but Mr. E. Smith writes as follows:—"The figures give a very rough notion of the valves copied. The auricle is both too long and too wide, and in fig. 9, *a*, the anterior area is not sufficiently large."

†*T. Saulii*.—This supposed manuscript species of Professor Wright combines the valves of the *Nausitora Saulii* of Wright (Trans. Linn. Soc. vol. xxv. pl. lxv. figs. 9-15) with the pallets of *Kuphus Mannii* of the same plate (figs. 1-8). Such combinations render identification hopeless to those whose libraries and whose leisure for research are limited.

*T. batava*.—This is not the shell designed by Spengler (Skriv. Nat. Selskab. vol. ii. pt. 1), whose characteristic figure of a pallet (pl. ii. fig. 3) coincides precisely with that of the *navalis* of the 'Iconica,' and is very different from the one here depicted. Surely the ascribed locality Batavia (which is not

\* "Two specimens had been so labelled in the British Museum from the Cumingian collection. The drawings differ in several particulars; the lower or narrow end of the valves (fig. 8, *b*) is much too incurved, and the inferior margin of the anterior area is also too arcuated. In fig. 8, *a*, the auricle is too prominent, and the central portion of the valve too narrow."—E. SMITH.

† Mr. Smith writes that, although the drawings are rough and incorrect, yet they are perhaps better than those in the 'Linnean Transactions.' Fig. 10, *a*, seems to him imaginative, for he could not find anything like it in the museum. The tablet indicated Callao, not Callas Bay; the specimens came from Miss Saul (1853), and why Professor Wright ascribed them to Port Phillip, Australia, was unknown to him.

appended to the example delineated) is not an imaginary one, derived from the supposed specific name *Batava* (Dutch). From a recent publication one learns that the European species still devastates the dykes of Holland.

The valves of the false *batava* are not so unlike those of *utriculus*; the pallets, however, differ from any I possess.

*T. affinis* and *T. brevis*, from "Mus. Deshayes" (his collection has been purchased intact by the French government for, I think, the Ecole des Mines; it is not in the zoological gallery of the Jardin des Plantes), should be rather "copied from Deshayes's published figure;" probably Deshayes did not possess the shell. It is a frequent error in the 'Iconica' to ascribe to authors the possession of species which they have only borrowed. In some of the earlier volumes indeed the metaphorically stereotyped "Mus. Cuming" was attached to shells lent by myself\*.

*T. palmulata*.—Lamarck so inadequately described this shell from its pallets alone that various members of the section *Xylotrya* have been adjudged its representative. Nevertheless the pictorial definition is fair enough. Adanson in 1759 (Mém. Acad. Paris, pl. ix.) figured three shipworms as the Taret de l'Europe, Taret de Sénégal, and Taret de Pondicherry (figs. 11, 12). From this last almost every figure of *T. palmulata* has been more or less ill copied. I do not find anything like it in the 'Iconica,' and certainly not the one here figured, which is probably the one so named by Thomson as an Irish species; I also, in youthful confidence, had accepted (Brit. Moll.) the same determination. Mr. Jeffreys, who accepted as typical some pallets in the Parisian Museum, from which he says "Lamarck described the species," though that author neither referred (as usual) to the museum nor to his own cabinet for the source of his description, asserts that they somewhat approximate but are distinct from those of *bipennatus*, and thus, indeed, they appear in the original engraving, which displays more than a score of articulations that taper from the first joint to the (brushy?) apex; the stalk only occupies one third of the entire length. These specimens once belonged to Réaumur, and agree with

\* As the fate of typical or even figured examples is not unimportant, I may state that very many of those rightly ascribed to "Mus. Metcalfe" and "Mus. Reeve" have passed into the collection of the author, who also purchased all the types described by Benson from Frederic Layard's cabinet.



the characters of Gray's ideal of *T. palmulata* (from a specimen in the British Museum). Blainville, who avowedly derived his description from Adanson's plate, has ascribed to his *T. Stutchburyi*\* pallets which precisely suit those of Adanson's figure, but says the valves are perceptibly less long than broad, which does not agree with the more equal height and breadth of the valve portrayed in Adanson's memoir. It is possible that the valves and pallet in one case or the other did not belong to the same species. It might save some confusion, if the shell be really a recognizable one, to prefer the earlier Lamarckian appellation of *bipalmulata* (Syst.) †.

In the synonymy of the Sowerbyan *palmulata* appears the name *T. Philippii*, Fischer. This name was first applied by Gray (Ann. & Mag. Nat. Hist. 1851) to Philippi's erroneous ideal of *T. navalis* (En. Mol. Sic. vol. i. pl. i.); but no description was attached to his correction.

*T. minima*, also annexed as a synonym, was very briefly described, in French only, by Blainville, in his often-mentioned monograph, as having a very long stalk to its pallet.

*T. senegalensis*.—Blainville, who has given this name to the Taret du Sénégal of Adanson (Mém. Acad. Paris, 1759, pl. ix., and Voy. Sénégal, p. 263, pl. xix.), observes that the pallet is truncated, not "bicornée." As these words did not harmonize with the pronged pallet depicted in the 'Iconica,' I was puzzled, but found on examination of the museum types that the fault lay in the drawing, which, as Mr. E. Smith declares, gives "but the feeblest notion of the processes copied." Adanson's figures, indeed, are so roughly executed that I hardly dare conjecture what they were designed for (*navalis*?, &c.). None of them, however, resemble the equally indefinite species of the 'Iconica.' The difference of outline in the valves of Adanson's three species is not very marked.

*T. nucivora*.—As the illustrator has stated that he had not seen the pallet, it is a pity that he did not more precisely state

\* Mr. Edgar Smith observes that "the only shells in the museum labelled *T. palmulata* were pencilled by Mr. Samuel Stutchbury (a dealer) as coming from Sumatra." He could not find either valves or pallets which would suit the figures in the 'Iconica.'

† I am a little reminded of Adanson's figures by the valve and first joint of the pallet of *T. (Xyl.) Dunlopi* of Wright (Trans. Linn. Soc. vol. xxiv.), a shell mentioned in Sowerby's monograph.

the source from which he copied it (fig. 17, c); the delineated specimen \* differs a little from the earlier representations of it, being shorter than in Spengler's drawing (Skriv. Nat. Selsk. vol. ii. pt. 1, pl. ii. fig. D). The statement that the British Museum had furnished the specimens is an error.

*T. denticulata*.—The reference should have been to Gray in Ann. & Mag. Nat. Hist. 1851, p. 386, where this name is given, without appended description, to the undescribed and supposed erroneous *navalis* of Möller. Naturalists might have been congratulated that this undeterminable shell was at length defined, only unfortunately the jagged tooth-like projection on the side of one of the pallets of the museum specimen (received from Möller, I fancy) seems the result of an injury or malformation. Both sides of the pallet are represented as symmetrically jagged, but this was imaginative. Mr. Edgar Smith remarks that the valves are inaccurately drawn.

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In making these comments upon the monograph of a peculiarly difficult genus, I wish expressly to declare that my criticism is solely designed to prevent the perpetuation, or origination, of errors which would spring from a misplaced confidence in the existence of specimens in the national collection.

It is the only illustrated monograph of the genus, the materials for which are too scattered and too rare to be readily accumulated and compared. An abundance of specimens and a fine library are absolutely indispensable to a conscientious naturalist, and even to obtain access to the latter is almost impossible for a scientific conchologist who permanently lives in England. Rich shell-collectors buy costly specimens, yet for names sponge upon the brains of those whose books they refuse to purchase.

\* "Mus. Brit. and Sow." "No tube, valves, or pallet like these drawings are in the museum."—EDGAR SMITH.